



## **STAFF REPORT**

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### **Establishing Guidelines for the Installation of Multi-Way Stop Signs on Residential Streets**

July 8, 2003

Honorable Mayor and City Council:

#### **Summary**

This report provides a discussion and recommended policy for the installation of multi-way stops signs in the City. The City currently uses the criteria established in the Caltrans Traffic Manual for the evaluation of multi-way stops. The Caltrans criteria are intended to be used on State highways and do not reflect conditions experienced on local roadways.

#### **Background and Discussion**

City Council requested staff to review the City's existing policy for the installation of multi-way stops. There is no current adopted City Council policy for multi-way stops. City staff has been using the criteria established by Caltrans or they have been using engineering judgment. The Caltrans criteria as defined in their Traffic Manual is intended for use on State facilities and does not accurately reflect many conditions experienced on local streets within a community. The review of the most recent installations of multi-way stops indicates that they were installed solely based upon engineering judgment and not based on any objective criteria.

The approval of multi-way stop sign installations is an easy way out for a City Council because of the relatively minor cost involved and because there may be frustration at not being able to "do something" for the citizen. The end result is transferring an alleged traffic problem to being an enforcement problem. The number of complaints to the police department requesting increased enforcement significantly increases.

The installation of a stop sign does not absolve the City from potential liability. The City is exposed to liability whether or not multi-way stops are installed at a particular intersection. The City of Alhambra, California lost an \$810,000 lawsuit involving the installation of a multi-way stop that did not meet their adopted criteria.

It is critical that the installation of multi-way stops be installed based upon some consistent and objective criteria. Many public agencies use the Caltrans criteria. However, a local agency may adopt their own criteria for the installation of multi-way stops. The City's liability exposure is significantly reduced as long as a consistent and objective criteria is used to determine whether or not multi-way stops should be installed.

The primary purpose of stop signs is to control intersection right-of-way. The stop sign is a useful regulatory traffic control device that directs motorists to stop at all times before proceeding through an intersection. A fully justified and properly installed stop sign can facilitate traffic movement, effectively assign right-of-way, reduce vehicle delay and decrease accidents. A stop sign is not a cure-all and is not a substitute for other traffic control devices.

#### MULTI-WAY STOPS FOR TRAFFIC CALMING

Many citizens feel that multi-way stops should be used as traffic calming devices. However, stop signs installed contrary to adopted criteria can generate their own set of problems. The concerns associated with multi-way stops that did not meet adopted criteria include liability issues, traffic noise, automobile pollution, and traffic enforcement and driver behavior.

A literature search found 70 papers about multi-way stop signs being used as traffic calming devices and their relative effectiveness in controlling vehicle speeds in residential neighborhoods and their relative effectiveness as traffic calming devices. The following summarizes the findings and list the number of references found for each of the findings:

1. Multi-way stops do not control speeds (22 references)
2. Stop compliance is poor at locations that did not meet stop sign criteria. This is based on the drivers feeling that the signs have no traffic control purpose. There is little reason to yield the right-of-way because there are usually no vehicles on the minor street (19 references)
3. Before-After studies show multi-way stops do not reduce speeds on residential streets (19 references)
4. Multi-way stops not meeting criteria increased speed some distance from the intersection. The studies hypothesize that motorists are making up the item they lost at the "unnecessary" stop sign (15 references)
5. Multi-way stop signs have high operating costs based on vehicle operating costs, vehicular travel times, fuel consumption and increased vehicle emissions (15 references)
6. Safety of pedestrians is decreased at multi-way stops not meeting the criteria, especially small children. Pedestrians expect vehicles to stop at the stop signs but many vehicle drivers have gotten in the habit of running the "unnecessary" stop sign (13 references)
7. Special police enforcement of multi-way stop signs has limited effectiveness. This has been called the "halo" effect. Drivers will obey the "unreasonable" laws as long as a police officer is visible (11 references).

## CALTRANS TRAFFIC MANUAL MULTI- STOP SIGN CRITERIA

The Caltrans Traffic Manual reads that any of the following conditions may warrant a multi-stop sign installation:

1. Where traffic signals are warranted and urgently needed, the multi-way stop may be an interim measure that can be installed quickly to control traffic while arrangements are being made for the signal installation.
2. An accident problem, as indicated by five or more reported accidents within a 12 month period of a type susceptible to correction by a multi-way stop installation. Such accidents include right and let-turn collisions as well as right-angle collisions.
3. Minimum traffic volumes
  - (a) The total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour for any 8 hours of an average day, and
  - (b) The combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same 8 hours, with an average daily to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour, but
  - (c) when the 85<sup>th</sup> percentile approach speed of the major street traffic exceeds 40 mph, the minimum vehicular volume warrant is 70 percent of the above requirements.

There are few, if any, locations in the City of Belmont that would meet Caltrans' criteria.

## PROPOSED MULTI-WAY STOP SIGN CRITERIA

The primary purpose of a stop sign is to assign right-of-way. The collision history at an intersection is an excellent indicator whether or not multi-way stops should be installed.

Multi-way stop signs are the most effective when the volumes on all the approaches to the intersection are near equal. The greater the difference between the traffic volumes on the major street compared to the traffic volume on the minor street, the less effective the signs will be. Vehicle drivers will run the stop when there is a large difference with the approach volumes.

There are conditions that are not in the Caltrans' criteria that may occur within the City of Belmont that may need to be considered for multi-way stops. Some of them are as follows:

1. The sight distance at the intersection is inadequate.
2. There are elementary school children using the intersection and the vehicles are in direct conflict with the pedestrians.
3. Other land uses generating pedestrian and bicycle activity that merits additional protection from vehicle traffic.

## PROPOSED GUIDELINES

The following outlines the proposed criteria for the installation of all-way stops. It should be noted that all-way stop signs would be installed if any of the following conditions exist:

1. Traffic and Pedestrian Volumes

- (a) A minimum hourly average (for any eight hours) volume of 300 vehicles entering the intersection from all approaches on an average day. In addition, the vehicular volume entering the intersection from the minor street or streets for the same eight hours must average 1/3 of the total volume entering the intersection (100 per hour minimum), or,
- (b) A minimum hourly average (for any eight hours) volume of 300 vehicles entering the intersection on the main approach and a pedestrian volume of at least 100 pedestrians per hour crossing the main street during the same eight hours.

2. Accidents

Three (3) or more types susceptible to correction by stop signs within a 12-month period, with satisfactory observance and enforcement of less restrictive control.

3. Visibility

The straight-line sight distance of one or more approaches of the major street for vehicles or pedestrian crossing the intersection is less than 150 feet.

4. Residential Area

Volume warrants to be reduced to 60% of the values above if ALL of the following conditions are met:

- (a) Both streets have residential frontage with existing 25 mph speed limits.
- (b) Neither street is an adopted through street.
- (c) Both streets are two-lane streets.
- (d) No existing stop sign or signal is located on the more heavily traveled street within a distance of 600 feet.
- (e) Intersection has four legs, with streets extending 600 feet or more away from the intersection on at least three sides.
- (f) Installation of a four-way stop is compatible with overall traffic circulation needs for the residential area.

5. Unusual Conditions

Volume warrants to be reduced to 60% of the values above if any unusual condition such as steep hill or curves.

**Fiscal Impact**

There is no fiscal impact as the result of adopting the proposed resolution. The proposed resolution will reduce the City's potential exposure to potential liability.

**Recommendation**

It is recommended City Council adopt a resolution establishing the guidelines for the installation of multi-way stops.

**Alternatives**

1. Refer back to staff for further information
2. Deny the request

**Attachments**

1. Resolution

Respectfully submitted,

Raymond E. Davis III, PE, PTOE  
Public Works Director

Jere A. Kersnar  
City Manager

**RESOLUTION NO. \_\_\_\_\_**

**CITY OF BELMONT  
San Mateo County, California**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BELMONT  
ESTABLISHING THE GUIDELINES FOR THE INSTALLATION OF  
MULTI-WAY STOPS**

**WHEREAS**, the primary purpose of a multi-way stop is to assign right-of-way at an intersection; and,

**WHEREAS**, stops signs are not to be used for the purposes of traffic calming; and,

**WHEREAS**, properly installed stop signs facilitate traffic movement and promote traffic safety.

**NOW, THEREFORE, BE IT RESOLVED**, that the guidelines for the installation of multi-way stops signs shall be as follows:

Multi-way stop sign installation may be considered if ANY of the following conditions exist:

1. Traffic and Pedestrian Volumes

- (a) A minimum hourly average (for any eight hours) volume of 300 vehicles entering the intersection from all approaches on an average day. In addition, the vehicular volume entering the intersection from the minor street or streets for the same eight hours must average 1/3 of the total volume entering the intersection (100 per hour minimum), or,
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I hereby certify that the foregoing Resolution was duly and regularly passed and adopted by the City Council of the City of Belmont at a regular meeting thereof held on this 8<sup>th</sup> day of July 2003.

AYES, COUNCIL MEMBER(S): \_\_\_\_\_

NOES, COUNCIL MEMBER(S): \_\_\_\_\_

ABSENT, COUNCIL MEMBER(S): \_\_\_\_\_

ABSTAIN, COUNCIL MEMBER(S): \_\_\_\_\_

\_\_\_\_\_  
City Clerk, City of Belmont

APPROVED:

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Mayor, City of Belmont